Amendments to the Claims:

Please amend claims 1, 4, 5, 6, 8, 12, 16, 19, 20, 21, 25, and 27-30, cancel claims 3 and 18 without prejudice, and add claims 31-42 as follows.

1. (currently amended) A sputtering source comprising:

a cathode assembly that is positioned adjacent to an anode, the cathode assembly including a sputtering target;

an ionization source that generates a weakly-ionized plasma from a feed gas proximate to the anode and the cathode assembly; and

a power supply that generates a voltage pulse ~~that produces an electric field~~ between the anode and the cathode assembly~~, the electric field~~ that creates ~~ing~~ a strongly-ionized plasma from the weakly-ionized plasma, an amplitude and a rise time of the voltage pulse being chosen to increase ~~the strongly-ionized plasma comprising a volume~~ a density of ions in the strongly-ionized plasma ~~that impact the sputtering target which~~ enough to generate sufficient thermal energy in the sputtering target to cause a sputtering yield ~~of the sputtering target~~ to be non-linearly related to a temperature of the sputtering target.

2. (original) The sputtering source of claim 1 wherein the electric field comprises a quasi-static electric field.

3. (cancelled).

4. (currently amended) The sputtering source of claim ~~3~~ 1 further comprising a gas flow controller ~~exchange means for exchanging~~ that controls a flow of the feed gas so that the feed gas diffuses the ~~with a new volume of feed gas while applying the electrical pulse across the new volume of feed gas to generate additional~~ strongly-ionized plasma.~~; comprising a second plurality of ions, the second plurality of the additional power creating additional ions that impacting the surface of the sputtering target, thereby generating additional thermal energy in the sputtering target.~~

5. (currently amended) The sputtering source of claim ~~3~~ 4 wherein ~~further comprising a gas~~ the feed gas allows additional power to be absorbed by the strongly ionized plasma, thereby generating additional thermal energy in the sputtering target. ~~exchange means for~~

~~exchanging the weakly-ionized plasma. with a new volume of feed gas while applying the electrical pulse across the new volume of feed gas.~~

6. (currently amended) The sputtering source of claim 1 wherein the thermal energy generated ~~by the first plurality of ions that impact~~ in the sputtering target does not substantially increase an average temperature of the sputtering target.

7. (original) The sputtering source of claim 1 further comprising a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the sputtering target.

8. (currently amended) The sputtering source of claim 1 wherein the voltage pulse generated between the anode and the cathode assembly ~~electrical field across the weakly-ionized plasma~~ excites atoms in the weakly-ionized plasma and generates secondary electrons from the cathode assembly, the secondary electrons ionizing the excited atoms, thereby creating the strongly-ionized plasma.

9. (original) The sputtering source of claim 1 wherein the power supply generates a constant power.

10. (original) The sputtering source of claim 1 wherein the power supply generates a constant voltage.

11. (original) The sputtering source of claim 1 wherein the ionization source is chosen from the group comprising an electrode coupled to a DC power supply, an electrode coupled to an AC power supply, a UV source, an X-ray source, an electron beam source, an ion beam source, an inductively coupled plasma source, a capacitively coupled plasma source, and a microwave plasma source.

12. (currently amended) The sputtering source of claim 1 wherein a rise time of the ~~electric field~~ voltage pulse is chosen to increase an ionization rate of the strongly-ionized plasma.

13. (original) The sputtering source of claim 1 wherein the weakly-ionized plasma reduces the probability of developing an electrical breakdown condition between the anode and the cathode assembly.

14. (original) The sputtering source of claim 1 wherein the strongly-ionized plasma is

substantially uniform proximate to the cathode assembly.

15. (original) The sputtering source of claim 1 wherein a distance between the anode and the cathode assembly is chosen to increase an ionization rate of strongly-ionized plasma.

16. (currently amended) A method for high deposition rate sputtering, the method comprising:

ionizing a feed gas to generate a weakly-ionized plasma proximate to a cathode assembly that comprises a sputtering target; and

applying a voltage pulse to the cathode assembly to generate ~~generating~~ a strongly-ionized plasma from the weakly-ionized plasma, an amplitude and a rise time of the voltage pulse being chosen so that ions in the strongly-ionized plasma ~~comprising a plurality of ions positioned proximate to a sputtering target; and~~

~~impacting the sputtering target~~ ~~with the plurality of ions~~ ~~to~~ generate sufficient thermal energy in the sputtering target to cause a sputtering yield ~~of the sputtering target~~ to be non-linearly related to a temperature of the sputtering target, thereby increasing a deposition rate of the sputtering.

17. (original) The method of claim 16 further comprising generating a magnetic field proximate to the sputtering target, the magnetic field trapping electrons proximate to the sputtering target.

18. (cancelled).

19. (currently amended) The method of claim ~~18~~ 16 wherein the ~~electric field~~ voltage pulse applied to the cathode assembly generates excited atoms in the weakly-ionized plasma and generates secondary electrons from the sputtering target, the secondary electrons ionizing the excited atoms, thereby creating the strongly-ionized plasma.

20. (currently amended) The method of claim 16 further comprising ~~exchanging a volume of~~ diffusing the weakly-ionized plasma with a volume of the feed gas while ionizing the volume of the feed gas to create ~~an~~ additional ~~volume of the~~ weakly-ionized plasma.

21. (currently amended) The method of claim 16 further comprising ~~exchanging a volume of~~ diffusing the strongly-ionized plasma with a volume of the feed gas while applying the

voltage pulse to the cathode assembly~~, generating~~ to generate ~~an~~ additional ~~volume of the~~ strongly-ionized plasma from the volume of the feed gas.

22. (original) The method of claim 16 wherein the peak plasma density of the weakly-ionized plasma is less than about 10^{12} cm^{-3}.

23. (original) The method of claim 16 wherein the weakly-ionized plasma reduces the probability of developing an electrical breakdown condition.

24. (original) The method of claim 16 wherein the ionizing the feed gas comprises exposing the feed gas to one of a static electric field, an AC electric field, a quasi-static electric field, a pulsed electric field, UV radiation, X-ray radiation, an electron beam, and an ion beam.

25. (currently amended) The method of claim 16 wherein the ~~impacting the sputtering target with the plurality of~~ ions in the strongly-ionized plasma causes at least a portion of a surface layer of the sputtering target to evaporate.

26. (original) The method of claim 16 wherein the peak plasma density of the strongly-ionized plasma is greater than about 10^{12} cm^{-3}.

27. (currently amended) A sputtering source comprising:

a cathode assembly that is positioned adjacent to an anode, the cathode assembly including a sputtering target;

an ionization source that generates a weakly-ionized plasma from a feed gas ~~from a first volume of feed gas that is located~~ proximate to the anode and the cathode assembly;

a power supply that generates a voltage pulse ~~that produces an electric field~~ between the anode and the cathode assembly that creates a strongly-ionized plasma from the weakly-ionized plasma, an amplitude and a rise time of the voltage pulse being chosen to increase a density of ions in the strongly-ionized plasma enough to generate sufficient thermal energy in the sputtering target to cause a sputtering yield to be non-linearly related to a temperature of the sputtering target ~~comprising a first plurality of ions~~; and

a gas controller ~~for exchanging~~ that controls a flow of the feed gas to the strongly-ionized plasma to facilitate the creation of additional ions ~~with a second volume of feed gas while~~

~~the electric field generates an additional strongly ionized plasma comprising a second plurality of ions from the second volume of feed gas, the first and the second plurality of ions impacting the sputtering target~~ ~~to~~ that generate ~~sufficient~~ additional thermal energy in the sputtering target. ~~to cause a sputtering yield of the sputtering target to be non-linearly related to a temperature of the sputtering target.~~

28. (currently amended) The sputtering source of claim 27 ~~further comprising a gas exchange means~~ wherein the gas controller controls a flow of feed gas that diffuses ~~for exchanging~~ the ~~weakly~~ strongly-ionized plasma ~~with a third volume of feed gas while applying the electrical pulse across the third volume of feed gas~~.

29. (currently amended) The sputtering source of claim 27 wherein the thermal energy ~~generated by the first and the second plurality of ions that impact the sputtering target~~ does not substantially increase an average temperature of the entire sputtering target.

30. (currently amended) A sputtering source comprising:

means for ionizing a feed gas to generate a weakly-ionized plasma; and

means for ~~generating a strongly-ionized plasma from~~ increasing the density of the weakly-ionized plasma~~, the~~ to generate a strongly-ionized plasma ~~comprising~~ having a density ~~a plurality~~ of ions ~~proximate to a sputtering target; and~~

~~means for impacting the sputtering target with the plurality of ions to~~ that generate sufficient thermal energy in the sputtering target to cause a sputtering yield ~~of the sputtering target~~ to be non-linearly related to a temperature of the sputtering target.

31. (new) The sputtering source of claim 1 wherein the rise time of the voltage pulse is in the range of approximately 0.1 microsecond to 10 seconds.

32. (new) The sputtering source of claim 1 wherein the amplitude of the voltage pulse is in the range of approximately 200V to 30kV.

33. (new) The sputtering source of claim 1 wherein a pulse width of the voltage pulse is in the range of approximately 10microsecond to 10seconds.

34. (new) The sputtering source of claim 1 wherein the ionization source and the power supply comprise a single power supply.

35. (new) The sputtering source of claim 1 wherein a repetition rate between the voltage pulses is in the range of 0.1Hz to 1kHz.

36. (new) The sputtering source of claim 7 wherein the magnet is chosen from the group comprising a permanent magnet, an electro-magnet, a balanced magnet configuration, and an unbalanced magnet configuration.

37. (new) The method of claim 16 wherein the rise time of the voltage pulse is in the range of approximately 0.1microsecond and 10seconds.

38. (new) The method of claim 16 wherein the amplitude of the voltage pulse is in the range of approximately 200V to 30kV.

39. (new) The method of claim 16 wherein a pulse width of the voltage pulse is in the range of approximately 1microsecond to 10seconds.

40. (new) The sputtering source of claim 27 wherein the rise time of the voltage pulse is in the range of approximately 0.1microsecond to 10seconds.

41. (new) The sputtering source of claim 27 wherein the amplitude of the voltage pulse is in the range of approximately 200V to 30kV.

42. (new) The sputtering source of claim 27 wherein a pulse width of the voltage pulse is in the range of approximately 1microsecond to 10seconds.